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## Terms of Reference

Project No	139 628
Project Name	Improving the Production and Dissemination of Statistics
Beneficiary	State Statistical Office of Republic of North Macedonia
Contracting Authority	The EU Delegation to the Republic of North Macedonia
Component	4A Developing metadata-driven IT system for standardized integrated statistical data production
Position	Expert in software solutions for statistical processing
Type	Senior Non-Key Expert
Days Allocated	Up to 60 work days
Location	Skopje, Republic of North Macedonia
Start/End of Assignment	November 2019 – June 2020

### 1. Background

The purpose of the project is further support of the State Statistical Office (SSO) of Republic of North Macedonia in harmonization with acquis and upgrading its statistical and ICT infrastructure for increased efficiency of the statistical production and improved data quality in order to respond better to emerging challenges from the changing EU acquis.

Developing a statistical system compliant with the EU standards is a long-term task, requiring solid investments in establishing a political, institutional and financial framework to allow full harmonisation with the EU acquis and the implementation of the European Statistics Code of Practice. Official statistics play a dual role in the Stabilisation and Association Process and in the EU accession process. First, Chapter 18 of the acquis defines the harmonisation of statistics with EU standards and rules, and has to be implemented in the pre-accession period. Second, official statistics serve other policy areas and chapters by providing the data from which policies can be developed, changes monitored and impacts assessed.

The SSO is responsible of coordinating the statistical system, producing statistics and managing the international relations in statistical sector. The SSO produces more than 70% of the official statistics. The SSO is an independent professional organisation whose competences and scope of work are regulated by the Law on Organisation and Operation of the State Administration Bodies and the Law on State Statistics. In accordance with the Law on State Statistics, the SSO, on the basis of scientific methods, provides users (legal and natural persons) with data on the economy, demography, social life, environmental protection and other areas. Official statistical data, as well as the time and content of all forms of dissemination, are protected from any kind of influence, and all users are treated equally.

The SSO adopted a new Rulebook on Internal Organisation of the Office in December 2015 in accordance with its competences defined by law and the Regulation on Internal Organisation of the State Administration Bodies ("Official Gazette" No. 93/00 and 14/02). According to the Rulebook, the Office performs its competences through 7 sectors and 39 departments, including regional offices. The



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organisational setup of the Office allows optimal management and monitoring of work processes and human resources management. The Office is managed by a Director appointed by the government. Serving in an advisory role is the Statistical Council, composed of 15 members, of which 14 are appointed by the National Assembly, while the Director of the Office is an ex-officio member.

The SSO performs its role in cooperation with other authorised bodies that are also responsible for producing official statistics under the Programme of Statistical Surveys 2018-2022. The Programme is a by-law that determines the statistical surveys that are implemented within a certain period of time and specifies the authorised bodies that collect, process and disseminate statistics. The Programme of Statistical Surveys lists all statistical surveys that produce official statistics. The authorised bodies are: the National Bank; the Ministry of Finance; the Ministry of Interior; the Ministry of Justice; the Hydro-meteorological Service; the Institute of Public Health; the Pension and Disability Insurance Fund; the Employment Agency. In the Programme for 2018-2022, a total of 319 statistical surveys are included and 252 of them are implemented by SSO.

By domain		
Domain	No. of surveys	%
Demographic and social statistics	102	32,0%
Economic statistics	201	63,0%
Environment and multi-domain statistics	16	5,0%

In its regular work the SSO cooperates with other stakeholders and has signed memoranda on cooperation with them: Central Register, National Bank, Agency for Electronic Communications, Ministry of Agriculture, Forestry and Water Management, Ministry of Finance, Institute for Public Health and Office for Civil Registration, Public Revenue Office, Employment Agency, Pension and Disability Insurance Fund, Customs Administration and Community of Local Self-government Units. These memoranda cover topics linked with: format of data delivery from administrative data sources to SSO, content of data and periodicity for data delivery. Inter-institutional collaboration and analysis of administrative data in terms of assessing the statistical concepts and definitions have been crucial in the procedure for obtaining data from administrative sources. Variables included in administrative databases are delivered to SSO on a regular basis and are subject of additional statistical processing.

The SSO of Republic of North Macedonia receives support to improve its statistical system mainly through the EU Instrument for Pre-accession Assistance (IPA). From February 2019, SSO is a Beneficiary to the IPA funded project "Improving the Production and Dissemination of Statistics" (IPDS). The activities of the current assignment are related to the Component 4 of the project: Further improvement of ICT infrastructure. This component aims to re-engineer the statistical IT system in line with EU and international standards, increasing the system efficiency and improving the processing of surveys. The first task of the component is to develop functional specification for re-engineered of the SSO IT system for statistical production and its development.

The IT system should be a comprehensive metadata-driven system for ensuring rationalized, standardized and integrated statistical data production processes by using advanced IT tools. In the new survey processing system, sampling, data entry, data integration, data editing and imputation, data validation and



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data processing will make use of metadata, thus ensuring a maximally end-user friendly working environment where there will be no need to re-program the processes in cases of changes.

Furthermore, the system should be able to provide output data in a form suitable for loading into MAKSTAT, Dissemination Data Base and/or for fulfilling SSO obligations towards Eurostat and other international organizations using the available SDMX-RI. The production environment of the system should provide effective tools for manageability and traceability of data and processes, as well as the management of the users, roles and their rights. The solution should be based on Microsoft platform (Windows, MS SQL Server and .Net Framework).

The key activities to be carried out under this Component include:

- Analysing and mapping the statistical processes ;
- Logical modelling of the statistical information (data + metadata);
- Description of process metadata necessary for editing, imputation, validation and estimation of quality indicators;
- Description of metadata for data entry and producing statistical outputs
- Description of the interface for analysing, editing and producing statistics;
- Description of the interface for managing the metadata in the central repositories

In the framework of another related project *EuropeAid/138214/IH/SER/MK "Tailor-made software development and data warehouse for economic statistics"* is to be developed a NAIMS (National Accounts Information Management System). It will apply the best EU practices *Macroeconomic statistics* and will cover statistical data processing and warehousing of the data for all surveys as well as the processing of significant part of them. Period of Implementation is January 2018 - November 2019.

## 2. Objectives and Description of the Assignment

### 2.1. Objectives

The activities of the assignment are part of the "Improving the Production and Dissemination of Statistics" IPDS project Component 4: Further improvement of ICT infrastructure. This component aims to re-engineer the statistical IT system in line with EU and international standards, increasing the system efficiency and sustainability, speeding up survey processing and data production, improving the accuracy and improve the timeliness of data.

The objective of the assignment is to define and describe an approach for using centralised statistical data repository and metadata-driven software for integrated statistical data processing in the State Statistical Office of the Republic of North Macedonia with adequate integration of SAS and other standardized statistical products where needed.

All necessary metadata items have to be defined and described as well as the design of interfaces for maintenance of the metadata and for statistical data processing - data entry, data editing, data processing, analysing data and production of statistical outputs.

The initial versions of the logical data model and the process model have to be developed.

The system architecture implementing all activities of the Collect, Process and Analyse phases of the Generic Statistical Business Process Model (GSBPM) has to be designed. It has to cover the statistical processes for web data collection, computerized field interview, paper questionnaires input and import of



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the data from administrative sources. The tools for the full-stack development in the .Net Framework and MS SQL Server environment have to be defined.

## 2.2. Scope of work

Out of the scope of work remain the large independent IT systems – Census, NAIMS, Farm Register and Foreign Trade. Statistical Business Register (SBR) will be developed separately under the Component 4B, but it is expected to use the central repositories for used classifications and code lists, as well as the mechanism of user access control of the new centralized system.

Statistical data processing related to the domain “Macroeconomic statistics” and performed in NAIMS or using NAIMS data will not use the structures and metadata of the new system. The maintenance of the classifications and multi-domain code lists in NAIMS will be based on data transfer from the central repository. Where existing, the statistical data exchange between NAIMS and the components of the centralized system will be based of import/export of flat files.

Reference metadata are stored and available in the in-house developed system SIMS 2.0. Only the link between surveys in the developing system and SIMS system has to be established.

The quality reports are created with in-house developed dedicated software, but the centralized system should maintain variables for estimation of some quality indicators and procedures for their calculation to be used in the quality reports creation.

The existing tools for dissemination (PX-Axis based MAKSTAT information system, SSO WEB site) will be used in the future and they will be loosely linked to the centralized system. The SDMX Reference Infrastructure will provide dissemination capabilities for the NAIMS and some other surveys and it is out of the scope of work. The new system has to transform the prepared statistical data and figures in the relevant format for the target dissemination tool using a metadata driven procedures.

The activities to be carried out include:

- Define together with Key Expert 3 the structures and their content - general survey data, classifications, code lists and system data.
- Define an approach for exchange of the data between the system repositories and the used third party tools for statistical processing (SAS, tArgus, Demetra)
- Define together with Key Expert 3 all necessary metadata items for:
  - Metadata related to the data entry;
  - Process metadata for editing, validation, imputation and data integration;
  - Metadata for calculation of derived variables and aggregates;
  - Metadata for estimation of quality indicators;
  - Metadata for preparation of statistical outputs for dissemination;
  - Metadata for import/export of statistical data and administrative sources
- Logical modelling of the statistical data and metadata repositories together with Key Expert 3
- Design the Solution Architecture and define the software products for the development stack. Windows environment and MS SQL Server RDBMS are prerequisites.
- Mapping the statistical processes to software components
- Significant contribution in the preparation of the System Requirements Analyses Document



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### 3. Deliverables

The expected results of the assignment, in team work with Key expert 3 and SAS Senior Non Key Expert consist of:

- Proposal for System Delivery Approach – the proposal will cover the phases Concept and Implementation of the System Development Life Cycle Operationalization. In addition, the proposal will include: related processes, roles, artefacts and deliverables, the procedures to be used during the design of the System including the approval of the deliverables under Component A.
- Proposal for Solution Architecture of the *Centralised Metadata-Driven System for Statistical Data Processing* based on MS SQL Server and .Net software. The system has to cover the GSBPM phases “Collect”, “Process”, “Analyse” and the process “Create dissemination products” from the Disseminate phase.
- Description of all metadata types for sampling, data collection, editing, validation, imputation, calculation of derived variables, data integration, calculation of weights, aggregation, data exchange, processing, estimation of quality indicators, analysis and preparation of outputs for further dissemination
- Logical Data Model
- System Requirements Analysis Document
- The preliminary design of interface for maintenance of classifications, code lists and all metadata, except the reference metadata
- The preliminary design of interfaces for statistical data processing (sampling, editing, validation, imputation, data integration, calculation of weights, aggregation, estimation of quality indicators) and their descriptions

### 4. Indicative work schedule

The assignment is expected to be performed in 11-12 full week (Monday-Friday) missions in Skopje in the period November 2019 – June 2020.

The first deliverable serves as Inception report and upon its approval and receiving comments and recommendations from SSO and EUD, the assignment implementation will continue.

### 5. Required profile of the expert

#### *General Professional Experience*

Master’s Degree in Informatics, Information Technologies or another relevant subject  
At least 10 years of general work experience and experience in building large-scale IT solutions  
Good knowledge of English  
Good communication skills

#### *Specific Professional Experience*

At least 5 years of experience in Business analysis and requirements engineering



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At least 5 years of experience in Creation of system architecture, especially software intensive systems

At least 5 years of experience in Business process modelling

At least 5 years of experience in Conceptual and logical data modelling

At least 5 years of experience in development of WEB applications

At least 5 projects with a senior development role in the creation of complex systems based on WEB technologies

Experience with MS SQL, .Net Framework, MVC, WebAPI 2, JavaScript language and JQuery

Understanding of statistical data collection and statistical data processing and experience in the implementation of statistical software will be considered as an advantage

Experience in projects with National and/or International Statistical Institutions will be considered an advantage

## 6. Logistics

### 6.1. Reporting

The Senior NKE shall work under the guidance and follow the instructions of the Key Expert 3 - Metadata-driven IT system. All deliverables should be submitted to Key Expert 3 and the Project Director.

The NKE shall collaborate with the project team, other experts involved and representatives of the beneficiary institution, as relevant.

Each of the missions, its timing and duration shall be agreed with the Project Director and Key Expert 3 prior to each mission.

### 6.2. Working language

The working language of the assignment and the deliverables must be English.

### 6.3. Starting date

It is expected that the work will be performed in several one to two week missions and starting from November 2019 onwards. However, exact starting date will be agreed at a later stage.

### 6.4. Location/Place of assignment

The NKE have to deliver the assignment missions in Skopje.

### 6.5. Applications

Applications (EUROPEAID format CV in English) need to be submitted by e-mail to the Project Coordinator: Ms. Raya Litova at: [r.litova@bim-bg.com](mailto:r.litova@bim-bg.com) no later than 15 November 2019.

References must be available on request. Only short-listed candidates will be contacted.

The Project is an equal opportunity employer.

All applications will be considered strictly confidential.

Advertised post is not available to civil servants or other officials of the public administration in the beneficiary country, Republic of North Macedonia.